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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/017,458	12/12/2001	Xiaojun Wang	0011-051	5293

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EXAMINER

LUHRS, MICHAEL K

ART UNIT	PAPER NUMBER
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2824

DATE MAILED: 12/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/017,458

Applicant(s)

WANG, XIAOJUN

Examiner

Michael K. Luhrs

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 14-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13, 23 and 24 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: search history.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-13 and 23-24, drawn to method, classified in class 438, subclass 586.
 - II. Claims 14-22, drawn to metal fill pattern (device), classified in class 257, subclass 202.
2. Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case Group II, the product as claimed can be made by another and materially different process, i.e. the margin region created by deposition, not growing.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.
4. During a telephone conversation with Attorney Henneman on December 10, 2002 a provisional election was made without traverse to prosecute the invention of Group I, method claims 1-13 and 23-24. Affirmation of this election must be made by applicant in replying to this Office action. Claims 14-22 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is advised that the reply to this requirement to be complete must include an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).

6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a petition under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Specification

7. The disclosure is objected to because of the following informalities: outlined below.

Appropriate correction is required.

8. Spelling, p. 12, line 1, change "ABSTACT" to --ABSTRACT--.

9. p. 4, line 7, change "Fig. 1" to read --Fig. 2--.

10. Suggested change to line 15, p. 6: "located only overlying the fill area of Figs. 3 and 4 and, in this example,"... change to: --located only overlying the fill area 38 of Figs. 3 and 4 and also, in this example,--

11. p. 6, line 30, change "Fig. 2" to read --Fig. 3--.

12. The attempt to incorporate subject matter into this application by reference to the phrase "While it is conceivable that an algorithm might be developed" (lines 15-16, p.5) is improper because it is a matter of fact that prior art does include such an algorithm patented (Chao et. al. USPN 5,790,417). Minimum change is to remove "conceivable" and replace it with --known--.

13. p. 7, line 1, change "(Fig. 2)" to read --(Fig. 3)--.

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14. p. 7, line 4, change “Similarly, In” to --Similarly, in--.

15. Lines 24-26, p. 7 are objected to on content: Lines 24-26, state: “however, it is thought to be more useful and necessary the closer such level is to the top layer, wherein the reduction of physical distortion is most critical.” While the applicant may feel their invention is more useful near the top layers, the examiner would find support in prior art that ‘reduction of physical distortion’ is most critical, *a priori*, most critical, at *the bottom*, so as not to distort *the top*. (Need a good “foundation” as well as, a good “roof”.)

16. The disclosure is objected to because of the following informalities: The applicant is reminded that the written specification should discuss/address each reference numeral appearing in the drawings. Since pp. 13-14 are superfluous, deletion of pp. 13-14 is recommended.

Appropriate correction is required.

Drawings

17. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character “10” has been used to designate both flowchart (i.e. of Fig. 1) and LCOS array (i.e. Fig. 2). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance. The suggested change is to remove “10” from Fig. 2.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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18. Claims 5-7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 5 recites the limitation "the dummy fill pattern" in line 2. There is insufficient antecedent basis for this limitation in the claim, because the trimming of the dummy fill pattern in step b is an abstract pattern formed by an abstract trimming procedure. To make further comparison utilizing the antecedent for dummy fill pattern in claim 5 from claim's 1 dummy fill pattern, is confusing, because of the comparison of an abstract pattern to be compared to the functional circuitry in claim 5. The examiner is uncertain as to the intended outcome of such a comparison, whereas there is a certain fundamental difference that an abstract pattern would not be functional in the first place, and no such comparison as "an example of" functional circuitry is therefore feasible. Claims 6 and 7 dependency on claim 5 having been objected are also objected to as a result of the indefiniteness created by claim 5 antecedent issue and comparison limitation.

Claim Rejections - 35 USC § 102

19. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12/13/12
20. Claims ^{1-7, 11-13}~~1-13~~, and 23-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Lee (USPN 6,281,049 B1).

Regarding claim 1, Lee discloses, (step) “a”, creating a margin area around the functional circuitry, by establishing the demarcation through the subtraction process of ‘first pattern’ (line 7 column 5) from ‘second pattern’ (line 9, column 5) to provide margin area demarcation established by the subtraction formed by the dummy region expressed as region 25 (lines 6-12, column 5); and (step) “b”, trimming a dummy fill pattern to the margin area to create a trimmed fill pattern, is disclosed by Lee as a result of having made the ‘subtraction’, i.e. the trimming aspect occurs by ‘subtracting’ the ‘second’ region 24 from the ‘first’, region 23, (as depicted in Fig. 4B) to result in the hatched area shown in the Fig., i.e. 4B; and (step) “c”, Lee discloses overlaying said trimmed fill pattern and the functional circuitry, by overlaying the trimmed fill pattern and the functional circuitry, as a ‘summation’ and ‘combining’, as expressed in Lee’s claim 1 ‘summing’, in line 47, column 8, and then ‘combining’, in line 55, column 8, that results in the final stencil information conveyed to a mask assigned to the photolithography that will ultimately govern the fill area.

Regarding claim 2, therefore, as expressed by Lee, and as outlined in the rejection citation for claim 1 above, Lee inherently removes excess metal through the subtracting methodology. In terms of the claim wording however, that states of ‘removing excess metal between steps b and c’ is indicative of the sliver removal, i.e. the removal of those areas that are too small to be in design compliance, or that may become dislodged during CMP, is also, in fact, disclosed by Lee, as in the down-sizing suggestion of line 52, column 6, that accounts for removing any slivers that could lead to problems.

Regarding claim 3, Lee explicitly addresses the “sliver” issue in lines 49-56, column 6. (and see also, Chao et. al., lines 47-53, column 10).

Regarding claim 4, Lee addresses the sliver issue, as per above, and such that, a sliver as being created by the result of the trimming process, is in fact, the sliver to which Lee is referring in lines 49-56, column 6, the act of down-sizing and over-sizing is the elimination, and concretely, Lee states that any remaining slivers is eliminated (lines 54-56 column 6).

Regarding claim 5, Lee inherently provides the dummy fill pattern as an example of an alternative functional circuitry, since the basis of establishing the dummy fill pattern is founded upon dimensions emanated from the existing circuitry.

Regarding claim 6, therefore, as per claim 5 described association, the alternative functional circuitry as being inherently the result of the emanation of dimension from functional circuitry nearby, is thus inherently 'aliqueness' to that selected inherently by the dimensional emanation. (i.e. inherent within the inherency).

Regarding claim 7, therefore also, Lee teaches that the dummy pattern is established from the circuitry is in fact on the same layer and further that such "alternative functional circuitry" have at least the minimum of the dimension thereof (lines 59 column 4).

Regarding claim 13, Lee teaches of the "growing" of the margin area by the distances depicted by "k" and "w" in Fig. 4B and subsequently the iterative procedure that follows in Fig. 4C that further provides patterning exterior to the functional area, as follows: By the applicant's phraseology the margin is the demarcation of the dummy area (as shown by the dashed line in applicant's Fig. 3) the extent of such demarcation is dictated by Lee's dimension "k" minus "w", with outward 'growth' further dictated by Lee's further process iterations of lines 13-19 column 5 as shown in Fig. 4C by regions 28 and 29 as being the "grown" regions.

Regarding claims 23 and 24, Lee selects active region pattern, i.e. rectangular region shown in Fig. 4A, provides a solid fill pattern to the dummy pattern, but also generates a pattern by the processing iterations, and in these three respects, selects a metal pattern from functional circuitry whereas, such 'filling' is further provided by utilizing the mask, once the patterning information has been conveyed, the photolithography has been performed, and the resulting patterning can then be subsequently 'filled'. In either instance of filling a partially filled area or of an unfilled area, it is inherent in Lee that a summation of dummy layer with active area will necessarily fill the dummy pattern in a filled area (at the time) just prior to being 'subtracted' by the 'second region' of lines 10-11 of column 5.

Claim Rejections - 35 USC § 103

21. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

22. Claims 8-10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee.

Regarding claims 8-10, Lee fails to disclose the pattern specifically *for* LCOS, however, in the teaching of Lee's method to create a mask for the metal fill and whereas a mask can be used in a method to create a LCOS array, the method taught by Lee that a mask used in creating the LCOS array could conceivably be the mask that Lee is teaching us to provide, i.e. a LCOS array contains active regions and since the mask is designed to protect active regions there is suggestion to use the mask for such active regions in the LCOS array for the protection offered, as a matter of obvious design choice. Under the principles of inherency, if a prior art device, in its

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normal and usual operation, would necessarily perform the method claimed, then the method claimed will be considered to be anticipated by the prior art device. *In re King*, 801 F.2d 1324, 231 USPQ 136 (Fed. Cir. 1986). See MPEP 2112.02. Also, *In re Japikse*, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950) (Claims to a hydraulic power press which read on the prior art except with regard to the position of the starting switch were held unpatentable because shifting the position of the starting switch would not have modified the operation of the device.); in this instance, the invention of Lee would not be altered by the applicant's claimed device limitation of exercising, specifically, the dummy metal fill pattern creation *in* the metal layer of an LCOS array, or *on* a metal layer of an LCOS array, for that matter, as well as, *under* a mirror layer, or, *on* a layer of reflective LCOS array, of claims 8, 9 and 10, respectively. That further, the disclosures in a reference must be evaluated for what they would fairly teach one of ordinary skill in the art. *In re Snow*, 471 F.2d 1400, 176 USPQ 328 (CCPA 1973); *In re Boe*, 355 F.2d 961, 148 USPQ 507 (CCPA 1966). Specifically, in considering the teachings of a reference, it is proper to take into account not only the specific teachings of the reference, but also the inferences that one skilled in the art would reasonably have been expected to draw from the reference. *In re Preda*, 401 F.2d 825, 159 USPQ 342 (CCPA 1968); *In re Shepard*, 319 F.2d 194, 138 USPQ 148 (CCPA 1963). In addition, it is proper to take into consideration not only the teachings of the prior art, but also the level of ordinary skill in the art. *In re Luck*, 476 F.2d 650, 177 USPQ 523 (CCPA 1973). Specifically, those of ordinary skill in the art are presumed to have some knowledge of the art apart from what is expressly disclosed in the references. *In re Jacoby*, 309 F.2d 513, 135 USPQ 317 (CCPA 1962). Namely, Lee points out their invention use, as a replacement to the 'isolation of devices using trenches' (method, line 6, abstract), as well as, trenches formed for the construction of the metallization for the device, per se, as in embodiment 2, column 5, beginning line 60, through column 6, line 31, is a sophisticated control

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methodology (lines 6-7 column 6) for the architecture, i.e. any architecture, that may benefit, from (photolithographic process) control of critical dimensions of a circuit device (line 7, column 6), and therefore, one having ordinary skill in the art would find consideration for the Lee invention for devices within a LCOS array.

Regarding claim 12, it has been previously pointed out that the minimum dimension of the dummy patterning have at least the minimum of the dimension thereof (lines 59 column 4) of the functional circuitry (see claim 7) is taught by Lee, and in this respect such pattern is indicative of 'selection to be of alternative functional circuitry'. In the simplest of form the examiner would take the position that dummy circuitry *is* functional circuitry, albeit just not connected, and inherently would be of a pattern of the functional circuitry upon selection, is then also alternative functional circuitry. In, claim 1 of Lee, line 43, column 8, "defining the dummy pattern region *as* the current pattern" carries grammar difficulty. Similarly grammar, for example, as in the applicant's line 4-5 abstract a "pattern selected from a pattern", such, could also be interpreted as "a metal fill pattern (5) is selected *similar to that of* functional circuitry". "Pattern" could have more than one definition, whereas a design pattern comes to mind initially, and an alternative definition/interpretation, that of a "neighborhood", from which the pattern is to be selected *from*, as being, "near to" (as in line 5 of applicant's abstract suggests that one do). You can select a metal fill pattern (50) by *providing* such a pattern as in applicant's Fig. 5, but the examiner objects to having to '*to select a pattern from an area near the functional circuitry pattern*', as being a clear and complete tangible selection of what the pattern is then to comprise.

23. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee, as applied to claim 1 above, in further view of Chao et. al. (USPN 5,790,417).

Regarding claim 11, the selection of a fill metal pattern is inherent in Lee in that Lee provides a rectangular region 21 as being the real active region as shown in Fig. 4A. Furthermore, Lee inherently provides a pattern outside of the functional circuitry by repeating the subtractive process of lines 6-12 column 5, with the process described in lines 13-18, column 5, such that a pattern exterior to the active region 21 shown in Fig. 4A is surrounded by the pattern (i.e. as is depicted by the hatched area) shown in Fig. 4C as is formed by the iterative process. Furthermore, in this case, the particular pattern within the pattern, is solid, a solid pattern being the specific type of pattern from which one could “select”, is thus inherently also provided by Lee. In the above three examples, Lee inherently provides the ‘selecting of a fill metal pattern between steps a and step b’. It is evident, furthermore, in light of Chao et. al., who teach of crossing various patterns with each other, that many variations of patterns within patterns can be implemented. Chao et. al. also teach an algorithm methodology and removal of slivers.

Conclusion

24. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kuroda et. al. (USPN 5,459,093) teach of dummy architecture and polygons (is addressing the impact of metallization orientation on planarity in three dimensions). Jaso et. al. (USPN 6,093,631) teach of increasing the density of patterns at peripheral areas to improve CMP. Liu et. al. (USPN 6,413,863) teach regarding vertical placement of dummy patterning.

25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael K. Luhrs whose telephone number is 703-305-2864. The examiner can normally be reached on M-F; 8:00 a.m. - 5:00 p.m..

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26. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard T. Elms can be reached on 703-308-2816. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

27. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

MKL

Michael K. Luhrs
December 13, 2002



RICHARD ELMS
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